

What is claimed is:

1. A user disposable sleeve adapted for use with an elongate sound controlling structure, the sound controlling structure having an outer surface with a non-constant radial profile over at least a portion of its length, the sleeve comprising:

an inner tubular member having means to allow radial expansion of a portion of the length thereof in response to contact with the non-constant radial profile of the sound controlling structure to releasably secure the sleeve to the elongate sound controlling structure; and

fitment means to conform to an inner surface of an ear, where the fitment means is fixedly disposed over the inner tubular member.

2. The user disposable sleeve of claim 1, wherein the sleeve is compressively held in position on the elongate sound controlling structure.

3. The user disposable sleeve of claim 1, wherein the inner tubular member is generally cylindrical with a lumen extending therethrough.

4. The user disposable sleeve of claim 1, wherein the inner tubular member includes an inner surface and is configured to permit at least part of the inner surface of the inner tubular member to remain in contact with the outer surface of the sound controlling structure when the disposable sleeve is disposed on the sound controlling structure.

5. The user disposable sleeve of claim 1, wherein the inner tubular member includes a distal region having a distal end and a proximal region having a proximal end, the tube having an inner surface and an outer surface.

6. The user disposable sleeve of claim 5, wherein the means to allow radial expansion comprises a plurality of preferential tear lines extending from the distal region to the proximal region.

7. The user disposable sleeve of claim 6, wherein the preferential tear lines extend from the distal end to the proximal end of the tube.

8. The user disposable sleeve of claim 5, wherein the means to allow radial expansion comprises a plurality of slits cut into the tube, the slits extending from the distal region to the proximal end of the tube.

9. The user disposable sleeve of claim 5, wherein the means to allow radial expansion comprises a plurality of axially aligned shaped grooves formed into the inner surface or the outer surface of the tube.

10. The user disposable sleeve of claim 9, wherein the shaped grooves comprise V-shaped grooves that extend from the distal region to the proximal end of the tube.

11. The user disposable sleeve of claim 5, wherein the means to allow radial expansion comprises a plurality of axially aligned thinned portions that are more elastic than other portions of the tube.

12. The user disposable sleeve of claim 5, wherein the means to allow radial expansion comprises the proximal portion of the inner tubular member having thin walls which allows elastic expansion relative to the distal portion.

13. The user disposable sleeve of claim 5, wherein the means to allow radial expansion comprises a spiral cut that extends from the distal region to the proximal region of the inner tubular member.

14. The user disposable sleeve of claim 13, wherein the spiral cut extends from the distal end to the proximal end of the tube.

15. The user disposable sleeve of claim 5, wherein the inner tubular member comprises polyethylene.

16. The user disposable sleeve of claim 1, wherein the fitment means comprises resiliently compressible foam, the foam having an inner foam surface.

17. The user disposable sleeve of claim 16, wherein the inner foam surface is attached to an outer surface of the inner tubular member.

18. The user disposable sleeve of claim 17, wherein the inner foam surface is adhesively attached to the outer surface of the inner tubular member.

19. The user disposable sleeve of claim 16, wherein the resiliently compressible foam is extruded over or is co-extruded with the inner tubular member.

20. The user disposable sleeve of claim 16, wherein the resiliently compressible foam is adapted to permit the foam to be compressed, inserted into an ear canal, and allowed to expand.

21. The user disposable sleeve of claim 1, further comprising removal structure secured to the inner tubular member, the removal structure configured to permit a user to remove the disposable sleeve from the sound controlling device.

22. A method of using an elongate sound controlling device having a non-constant radial profile, comprising steps of:

providing a disposable sleeve, the disposable sleeve comprising an inner tubular member having means to securely but releasably attach the sleeve to the elongate sound controlling structure and resiliently compressible foam secured to the inner tubular member, the foam configured to conform to an inner surface of an ear;

axially sliding the disposable sleeve onto the elongate sound controlling device;

compressing the foam;

inserting the elongate sound controlling device into an ear canal; and

allowing the foam to expand.

23. The method of claim 22, further comprising an initial step of removing a previously installed disposable sleeve.

24. The method of claim 22, wherein the inner tubular member includes means to permit at least a portion of the inner tubular member to expand or move radially outward to accommodate the non-constant radial profile of the elongate sound controlling structure.

25. A sound controlling structure, comprising:

an elongate sound tube; and

a disposable sleeve disposed over the elongate sound tube, the disposable sleeve comprising:

an inner tubular member having means to allow radial expansion of at least a portion thereof to securely but releasably secure the sleeve to the elongate sound tube; and

fitment means to conform to an inner surface of an ear, where the fitment means is secured to the holding means.

26. The sound controlling structure of claim 25, wherein the sleeve is compressively held in position on the elongate sound controlling structure.

27. The sound controlling structure of claim 25, wherein the means to allow radial expansion is configured to permit at least a portion of the inner tubular member to expand or move radially outward to accommodate the non-constant radial profile of the elongate sound controlling structure.

28. The sound controlling structure of claim 25, wherein the inner tubular member comprises a generally cylindrical tube having a distal region having a distal end and a proximal region having a proximal end, the tube having an inner surface and an outer surface.

29. The sound controlling structure of claim 28, wherein the means to allow radial expansion comprises a plurality of preferential tear lines extending from the distal region to the proximal region.

30. The sound controlling structure of claim 28, wherein the means to allow radial expansion comprises a plurality of slits cut into the tube, the slits extending from the distal region to the proximal end of the inner tubular member.

31. The sound controlling structure of claim 28, wherein the means to allow radial expansion comprises a plurality of axially aligned shaped grooves formed into the inner surface or the outer surface of the inner tubular member.

32. The sound controlling structure of claim 28, wherein the means to allow radial expansion comprises a plurality of axially aligned thinned portions that are more elastic than other portions of the inner tubular member.

33. The sound controlling structure of claim 28, wherein the means to allow radial expansion comprises a highly elastic proximal portion having a thin wall relative to the distal portion.

34. The sound controlling structure of claim 28, wherein the means to allow radial expansion comprises a spiral cut that extends from the distal region to the proximal region of the tube.

35. The sound controlling structure of claim 28, wherein the tube comprises polyethylene.

36. The sound controlling structure of claim 25, wherein the fitment means comprises resiliently compressible foam, the foam having an inner foam surface and an outer foam surface.

37. The sound controlling structure of claim 25, further comprising removal structure secured to the inner tubular member, the removal structure configured to permit a user to remove the disposable sleeve from the sound controlling device.

38. A sleeve comprising:

an outer portion of resiliently compressible polymeric foam having an outer surface adapted to conform to the inner surface of an ear after the foam outer portion is compressed, inserted into the ear canal, and allowed to expand, said outer portion having opposite first and second ends, and an inner surface extending through the outer portion between said first and second ends; and

a tube of relatively stiff flexible material having an axis and opposite axially spaced first and second ends, an outer surface adhered to said inner surface of said outer portion, and an inner surface defining a through passageway, the outer and inner surfaces of said tube having cross sections of generally uniform shape and size along said axes, said tube having a continuous generally annular portion adjacent said first end, and a plurality of axially extending circumferentially spaced slits between the inner and outer surfaces of said tube extending from said annular portion to the second end of said tube and defining axially extending portions of said tube that can flex radially outwardly of the axis of the tube.

39. The sleeve of claim 33, wherein said tube is an extrusion of polymeric material.

40. The sleeve of claim 33, wherein said inner surface of the foam outer portion has an axis and has a cross section of generally uniform shape and size along its axis that corresponds in size and shape to the outer surface of the tube both when the



foam outer portion is adhered to the tube and when the foam outer portion is fully expanded and the inner surface is not attached to or compressed by any structure.

41. The sleeve of claim 33, wherein said inner surface of said outer portion and said outer and inner surfaces of said tube are cylindrical and generally coaxial.

42. The sleeve of claim 33, wherein said tube has in the range of 3 to 12 axially extending portions.

43. The sleeve of claim 33, wherein said tube has in the range of 6 to 8 axially extending portions.

44. The sleeve of claim 33, wherein said tube is made of a rubberized elastomer having a Shore A reading in the range of 40 to 100.

45. The sleeve of claim 33, wherein said tube is made of urethane having a Shore A reading in the range of about 60 to 80.

46. The sleeve of claim 33, wherein said axially extending portions have distal ends at the second end of the tube that are generally aligned with the second end of the outer portion.

47. The sleeve of claim 33, wherein said axially extending portions have parts adjacent the second end of the tube that project past the second end of the outer portion.

48. The sleeve of claim 33, wherein said axially extending portions have distal ends at the second end of the tube, some of said axially extending portions being positioned at the second end of the outer portion, and one of said axially extending portions including a manually engageable tab projecting past the second end of the outer portion.